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# *GLOEOSPORIUM PLATANI*, THE CAUSAL FUNGUS OF THE PLANE-TREE ANTHRACNOSE DISEASE (NOTE)

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ABSTRACT

*Gloeosporium platani (Gnomonia platani)*, the causal fungus of the plane-tree anthracnose disease is described for New Zealand.

Plane-trees (*Platanus* spp.) in New Zealand, particularly in Christchurch have become extensively diseased in the last three years. The causal organism was found to be the fungus *Gloeosporium platani* (Mont.) Oud., one of the asexual forms of the ascomycetous fungus *Gnomonia platani* Kleb.

*Gl. platani* is an Imperfect fungus in the form-family Melanconiaceae, which includes many parasites of plants and cause a general group of diseases called anthracnoses. Anthracnose, in the modern sense, is a disease characterised by distinctive limited lesions on stems, foliage or fruit, often accompanied by dieback of twigs and branches. Anthracnose of plane-trees is distinguished by leaf blight, defoliation, dieback and cankering of twigs (Fig. 1), branches and the trunk of infected trees. Anthracnose diseases are further characterised by conidia (spores) borne in acervuli (compound sporophores composed of a basal stromatic layer and short erect conidiophores arranged in a palisade, the whole forming a flat bed) as seen in Fig. 3. Acervuli containing spores of *Gl. platani* are prominent on the necrotic areas of leaves along the midrib and veins during the spring and summer and cover the whole blade at the time of senescence. The majority of these acervuli are formed on the undersurface. Acervuli are also found on twigs, branches and on necrotic areas found on the trunk. The spores found in all these acervuli, regardless of place of origin, are identical and produce typical cultures on potato dextrose agar.

The following description is based on leaf midrib acervuli. The acervuli are 100-300 µm in diameter and are buff to fuscous black in colour. The base of the acervulus consists of a stromatic layer and erect conidiophores, measuring 15-20 µm, arranged in a palisade manner (Fig. 3). Spores are released from the end of the conidiophores (Fig. 2) leading to great numbers being held in a gelatinous matrix. Under suitable conditions spores are exuded in a tendril-like, creamy white mass. The conidia are irregular in shape being elliptical,

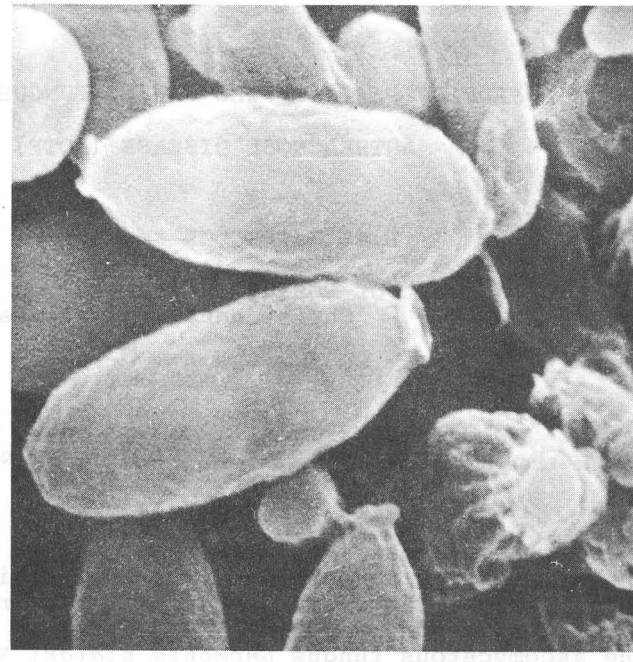

Fig. 1 (Left) Cankers are evident on twigs and small branches.

Fig. 2 (Above) Conidia are released from the ends of conidiophores.

obpyriform or ovate to oblong, unicellular and hyaline, measuring 9-14 µm (Fig. 4). Freshly prepared specimens show that these spores are biguttulate i.e. contain two oil globules (Fig. 4). The spores germinate in a few hours in water and develop a single germ tube which soon branches and forms septate hyphae.

Isolation from diseased tissue is achieved by plating out infected host tissue or spores produced in acervuli onto potato dextrose agar.

In culture two types of hyphae can be distinguished measuring 1-2.5 µm and 3-6 µm respectively. Vesicular-like swellings are frequently observed and may be formed in intercallary or terminal positions on the hyphae.

Conidia produced in culture are slightly larger than those produced *in vivo* i.e. 10-15 µm x 4-6 µm and are produced

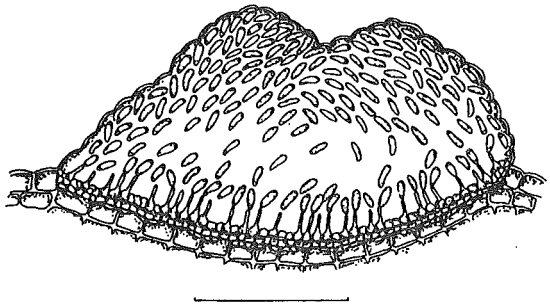


Fig. 3 A cervulus of *Gloeosporium platani*.

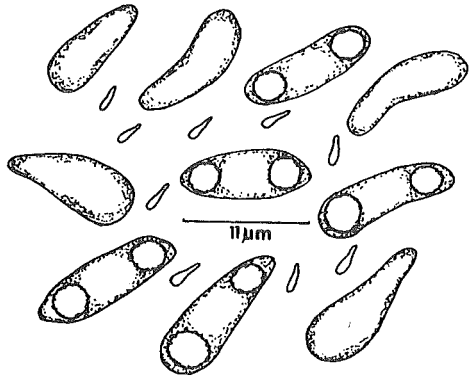


Fig. 4 Macro- and micro-conidiospores of *Gloeosporium platani*.

terminally, singly or in basipetal succession from phialides (terminal portion of a hypha, from the apex of which thin-walled conidia are abstricted) on the mycelium. Microconidia or secondary conidia not produced *in vivo* were formed in culture measuring approximately 5x1 µm being pyriform in shape (Fig. 4) and are also produced from phialides.

The fungus produces a circular colony on potato dextrose agar consisting of zones of elevated mycelium alternating with zones of mycelium adpressed to the agar surface. The raised regions have exudate droplets within the aerial hyphae and hard dark structures, resembling microsclerotia, (resting bodies of variable size, composed of a hardened mass of hyphae with or without host tissue, usually with a darkened rind; from which fruit bodies, conidiophores or mycelium may develop) measuring 100-200 µm in diameter. These are described best as pycnidia produced *in vitro*. The structures when sectioned using a freezing microtome were found to consist of a series of chambers containing conidia. Pycnidia of this type were not found *in vivo* during the course of this study. The raised regions appear dark brown when viewed from below which is probably caused by dense mycelial growth, an accumulation of vesicular swellings, anastomoses of hyphae (fusion crosswise to form a network), the presence of pycnidia and an increased production of spores.

The zonation is endogenous rather than exogenous i.e. not a response to environmental factors. This is demonstrated by formation in both fluctuating and constant external conditions and by variation in zonation of cultures maintained

in constant external conditions. This distinct contoured pattern of the colonies may be a staling phenomenon, i.e. growth of the fungus being retarded by the build-up of its own metabolites resulting in dense mycelial growth. Spores of this fungus producted *in vitro* are being used in pathogenicity studies to evaluate possible resistant species of plane-trees.

ACKNOWLEDGMENT

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